Children's Grammaticality Judgments of Nonfinite Verbs & Uninverted Wh- Questions

A Senior Honors Thesis

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by

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ABSTRACT

A frequently noted phenomenon in child English grammar is the failure to express tense inflection in verbs, producing sentences like, “He play ball.” Wexler (1994) suggested that children pass through an Optional Infinitive Stage during which both finite and nonfinite verbs would be grammatically acceptable to children. A similar error of child English that has been repeatedly noted is the failure to invert the subject and verb in forming wh-questions (e.g. What Mommy can eat?). In this thesis, I explore the possibility that the optionality of subject-verb inversion is related to the optionality of verb finiteness marking. Rizzi (1996) explicitly proposes such a link by suggesting that in questions, an interrogative feature that is associated with Tense raises on verbs to the head of the Complementizer Phrase (*CP*). If Rizzi’s theory is correct, then subject-verb inversion (*V* to *I* to *C*) will only take place with verbs that are finite. The implication of this hypothesis is that optional finiteness marking on verbs may only produce *V* to *I* to *C* movement in those cases in which the finite option is chosen. If Rizzi is correct, these two phenomena (verb finiteness marking and subject-verb inversion) should be linked in development. To test this hypothesis, we carried out two "Grammaticality Choice Task" (Pratt & Grinstead 2007) experiments with the same group of 18 children between the ages 3;0-6;0. In the first experiment the children were asked to choose between finite and nonfinite verbs. In the second, they chose between inverted and uninverted wh-questions. Following Rizzi’s theory, we hypothesized that children should be able to correctly identify verb finiteness more proficiently than subject-verb inversion, as a function of verb raising to Tense. In addition to this, we hypothesized that their performance on the two tasks should be correlated, as movement from *T* to *C* should only be possible when

movement has first taken place from *V* to *T*. Results indicated that 16 of 18 children (89%) had better results on the finiteness test (mean percentage correct = 82%, range = 42-100% correct) than they did on the inversion test (mean percentage correct =73%, range 32-100% correct). Further, in spite of this statistically significant difference (paired t-test, $t(17) = 2.338$, $p < 0.032$, two tailed), their results were highly correlated (Pearson Correlation = 0.721, $p < 0.001$). Therefore I argue that because finiteness marking develops more quickly than inversion, and because the development of inversion closely tracks the development of finiteness in individual children, finiteness marking is a necessary condition for inversion. In this way, these results are consistent with the hypothesis that optional finiteness in child English causes optional inversion in wh-questions in child English.

ACKNOWLEDGEMENTS

This project has brought me invaluable academic growth as well as unforeseen understanding of an area of study that I hope to pursue, perhaps, for a lifetime. I cannot begin to thank all of those who have assisted me in this ever-growing project, but I must acknowledge those who have helped me most: Dr. John Grinstead for his insightfulness, guidance, and never-ending patience. I must thank everyone who assisted me in the administration of this study for the selfless donations of their time: Anthony Contini, Benjamin Weinhold, Dan McCurley, Kacia Strous, Alexander Harper, and Peg Warren. I would especially like to thank all my family and friends for their constant support and encouragement throughout the project. A special thank you also goes to the Summer Research Opportunity Program at The Ohio State University for their guidance, motivation, and especially, for the funding that made this research possible.

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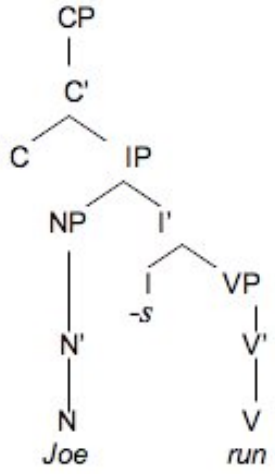
Chapter 1. Introduction

A long-standing debate in the study of child language acquisition is the question of how language develops and how accurately the speech produced by children reflects their grammars. The Continuity Hypothesis (Pinker 1984) suggests that children's grammars are internally coherent systems that develop gradually until becoming the adult system. It has been noted across studies that children frequently omit tense inflection, producing sentences like, "I running across the street." and also fail to invert subjects and verbs in wh- questions, producing sentences like, "What mommy can eat?" (Bellugi 1966, Brown 1973, etc).

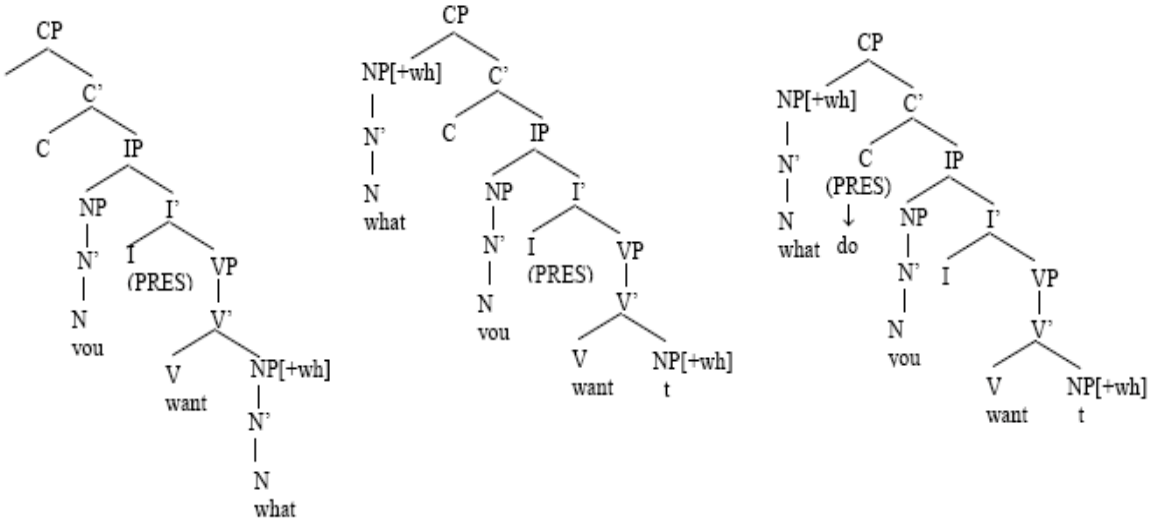
In order to account for the verbs that optionally lack tense marking, Wexler (1998) proposes the Optional Infinitive Stage during which verbs are optionally marked for finiteness in child grammar. Wexler assumes, following Chomsky (1995), that sentences have hierarchical structure and that words, such as verbs, which bear inflectional morphology (such as the present tense "s" on the verb "eat-s"), move from their initial syntactic position to higher syntactic positions in the structure in order for the "s" to express present tense and 3rd person singular agreement (Figure 1.1).

Figure 1.1



The hypothesis behind the Optional Infinitive Stage would claim that this seemingly sporadic expression of finiteness would be a result of the verb sometimes raising from *V* to *I* and sometimes not. The expression of finiteness on verbs, however, is not the only optional grammatical process we find in the speech of children. A prominent theory of how wh- questions are formed in English (Rizzi 1991) assumes that the verb moves above the subject to a position higher in the structure. If the verb is an auxiliary, it is raised to *C* above the subject in the question (e.g. The girl is happy now. When is the girl happy?). If the sentence contains only a main verb, do-support provides a supplemental auxiliary that will then carry the inflection onto *C* instead of the main verb raising (e.g. The boy plays in the sand. Where does the boy play?; see Figure 1.2). Chomsky (1981) proposed the Head Movement Constraint, which in this case dictates that verbs move upwards in a sentence structure and that they are unable to skip over an empty head before passing on to their final destination. Given the structure in Figure 1.1 and the Head Movement Constraint, we see that verbs raising from *V* to *C* are required to pass through *I* first, where the verb will acquire inflection (tense, person, number).

Figure 1.2



*From Susi Wurmbrand and William Snyder, University of Connecticut http://www.sp.uconn.edu/~li101is1/FALL03/

Given the observation that finiteness marking in child English is optional, if Rizzi's account of *V*-to-*I*-to-*C* movement is correct, and if the Head Movement Constraint is correct, then it can be said also that there should be an interaction between the phenomenon of finiteness marking and subject-verb inversion.

In this thesis, I explore the possibility that the optionality observed in finiteness marking on verbs in child English could be the cause of the optionality of verbs raising above subjects in wh- questions. Pratt and Grinstead (2007) noted an apparent correlation between nonfinite verb errors and uninverted wh- questions in child Spanish, but the number of children who did both of the experiments was too small for the results to be statistically significant. The current study consists of two such grammaticality judgment tasks in English through which we have attempted to measure the grammar of verb finiteness and subject-verb inversion in preschool-aged English speakers. By testing both constructions in the same group of children, we hope to establish whether or not there is a

correlation between children's knowledge of the two constructions, thus confirming adult syntactic theories (e.g. Rizzi 1991), which predict a connection between the two. Further, we will investigate specific properties of finiteness marking and wh- question formation, including whether multiple morphological markers of tense develop in parallel, as has been reported in longitudinal studies (Rice, Wexler, & Hershberger 1998; Rice, Wexler, & Redmond 1999), and whether the different types of finiteness markers invert to different degrees in questions. Finally, we will investigate whether the type of wh- pronoun has an effect on the degree to which verbs invert.

Chapter 2. Study 1: Verb Finiteness Grammaticality Judgment Task

2.1 Background

It has been generally noted that children frequently omit verb finiteness during early stages of language acquisition (e.g. Brown & Hanlon 1970; Cazden 1968). During this stage, Wexler hypothesizes that verbs raise from *V* to *I* for inflection optionally, so that children produce sentences such as "Mommy eats grapes," as well as "Mommy eat grapes," (see Figure 1.1).

The –s morpheme is taken to represent tense, but there are other word endings (inflectional morphemes) which also mark tense on verbs, including –ed for tense, and auxiliary verbs *be* and *do*. Rice, Wexler, & Hershberger (1998) and Rice, Wexler, & Redmond (1999) found in their longitudinal studies that the growth curve patterns of all of the tense-marking morphemes are similar over time in typically-developing as well as language-impaired children. The thesis presents the results of a grammaticality judgment task used to measure children's ability to distinguish finite from nonfinite verbs, as in

Rice, Wexler, & Redmond (1999), however, we will look cross-sectionally at a sample of typically-developing children between the ages of 3- and 6-years-old to see whether we find similar rates of growth of the different morphemes which represent tense.

2.2 Methods

Participants

The participants in this study were twenty-two typically developing monolingual child English speakers from childcare centers in Central Ohio. Their ages ranged from 3;0 to 6;0. Their mean age was 4;6. The group consisted of seven 3-year-olds, eight 4-year-olds, six 5-year-olds, and one 6-year-old who successfully completed the task. Twenty-six additional children who did not successfully complete the task were omitted from results.

Procedures

We used a grammaticality judgment task experiment to determine how well children were capable of determining the grammaticality of nonfinite verbs. The task is an adaptation of Pratt and Grinstead's Grammaticality Choice Task model (2007). We began the test by explaining to the children that we were going to play a game in which the puppets (a monkey and a hippo) were still very young and learning to talk. We asked the children if they could help the young animals learn by letting them know whenever one of the animals produced a wrong sentence.

Both the kids and the puppets were shown an illustration for each set of utterances. The utterances were based on the vocabulary in the *MacArthur Communicative Development Inventory.* Each puppet would then produce a sentence about the picture, one being grammatical in the adult language and the other representing the kind of sentence

we believe early child grammars to optionally allow: nonfinite verbs. The first four statements were practice to ensure that the children understood the format of the game, followed by pairs of sentences delivered by the two puppets. The ungrammatical sentences came from either puppet pseudo-randomly, without either puppet ever saying more than three consecutive correct or incorrect sentences at any point.

Because in pilot work we found that some children would pick one puppet continuously for reasons unrelated to language, we included filler questions in which the incorrect sentence was uttered by the last correctly chosen puppet (following McDaniel, Chiu, & Maxfield 1995), thus forcing the child to either select the least favorite puppet or to implicitly show that they were not following our experimental format. The filler questions were utterances that Rice, Wexler, & Redmond (1999) showed that even very young children are able to readily identify as incorrect, including verbs missing *–ing* morphemes when the auxiliary *be* is present (e.g. The girl is hugging the tiger. The girl is hug the tiger.). This system also provided us with a way to anticipate the child using a pattern to select answers (such as alternating between the puppets) so that we were able to break the pattern by making a puppet obviously correct twice in a row. These filler questions were essential to our experiment because they provided our basis for knowing how reliable the children's responses were. Children who answered more than one of the four filler questions incorrectly were omitted from results.

The verb finiteness task had children determine the grammaticality of nonfinite verbs in simple sentences about the presented illustrations. There were twenty-four pairs of sentences in this set, in addition to the practice and filler questions. The main verbs

used include six sentences each of third person singular present tense *-s*, regular past tense *-ed*, copula “be”, and auxiliary “be”.

1. a) Oscar flies a kite.
   b) Oscar fly a kite.
2. a) The dinosaur is big.
   b) The dinosaur big.
3. a) Goofy is playing soccer.
   b) Goofy playing soccer.

The principal idea of the task is to evaluate children's grammars independently of the frozen form utterances that they may use in their spontaneous production by not allowing them to draw fully inflected forms from their lexicons, but rather by having them choose the correct utterance from the two possibilities that the experimenters have created. We think that because the children only have to remember both sentences for a matter of seconds in order to determine which one is grammatical, this should give us the most accurate reading possible of their grammars.

2. 3 Results

We can see from Figure 2.1 that auxiliary "be" was much more challenging for the 3- and 4-year-olds, but by age 5 most of the children seem to reach ceiling and we can see all the variables are nearly equally difficult. In this thesis, we define "ceiling" as answering correctly 90% or more of the time, such as would most adults.

Third person present singular –s seems to change the most dramatically, initially being one of the most frequently omitted morphemes with 3-year-olds and resulting in the least commonly omitted with 5-year-olds. This can be explained by the regularity of the third person singular –s morpheme in English in comparison to the irregularities of past tense forms and both auxiliary and copular forms of "be".

Figure 2.1

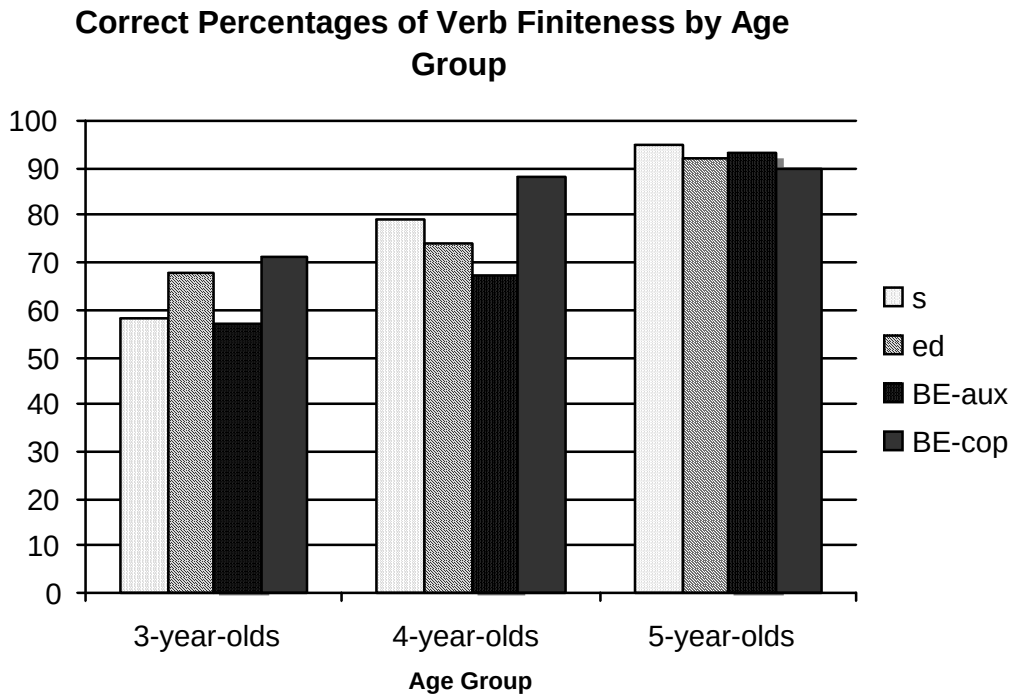


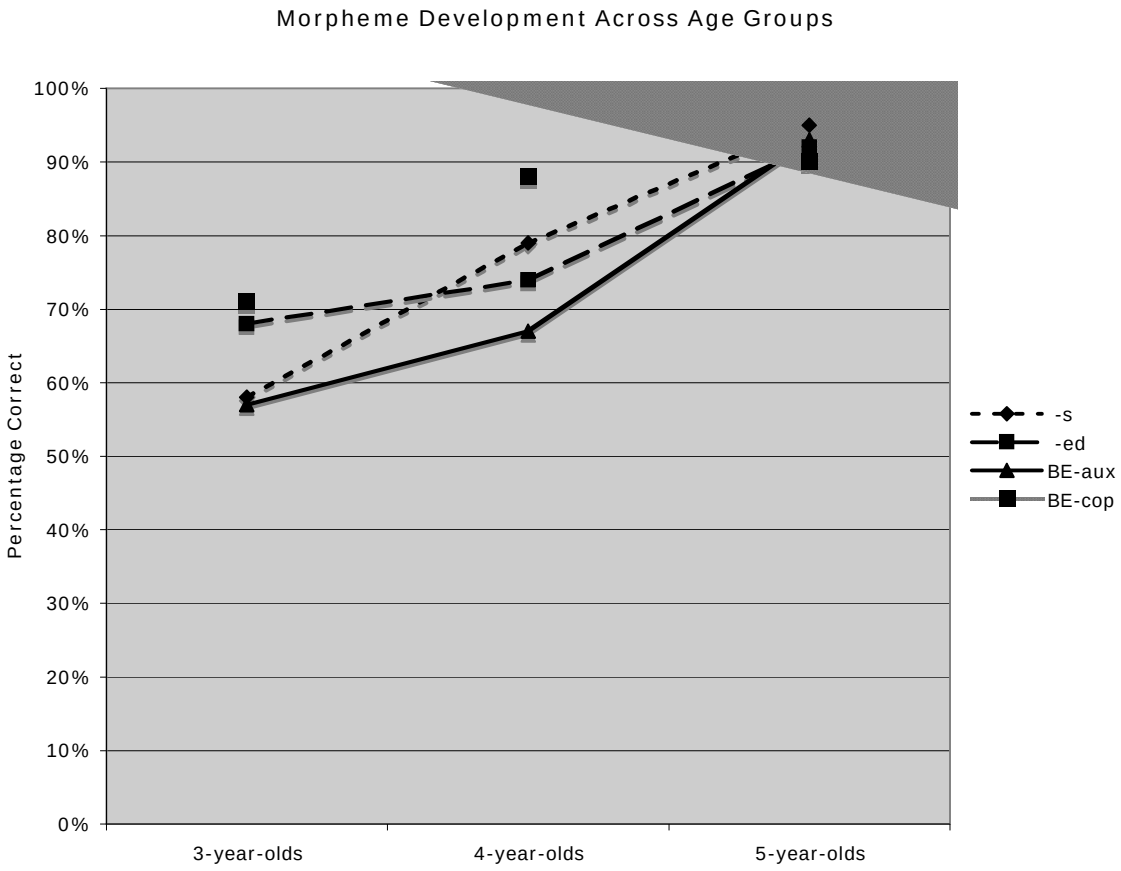
Table 2.1

Verb Finiteness Percentage Correct by Age Group and Morpheme				
	-s	-ed	BE-aux	BE-cop
3-year-olds	58%	68%	57%	71%
4-year-olds	79%	74%	67%	88%
5-year-olds	95%	92%	93%	90%

2.4 Discussion

Rice et al (1998) showed that there should be similar growth curves for different morphemes across ages in their longitudinal study. Looking at Figure 2.2, we can see that across our 3 age groups, the 4 morpheme types do indeed develop in similar ways from the 3-year-olds, who are equally happy to choose finite or nonfinite verbs (just over 50%), to the 5-year-olds who virtually always insist on the finite verbs only.

Figure 2.2



These preliminary findings are a cross-sectional corroboration of the findings in Rice, Wexler, & Redmond (1999) and support the position that abstract syntactic tense develops over time and can be measured receptively, using multiple morphological expressions.

Chapter 3. Study 2: Subject-Verb Inversion Grammaticality Judgment Task

3.1 Background

Children's failure to invert subjects and verbs in wh- questions is an area of much study with seemingly little conclusion. Bellugi (1966) performed a longitudinal study of three children's inversion abilities, and found that children passed through stages of development during which yes-no questions were sometimes inverted but wh- questions were not. Instead, wh- questions were marked only with the wh- word in sentence initial position and the verb in the same position it occupies in declarative sentences. Ingram & Tyack (1979) did a cross-sectional study of twenty-one children that found no resemblance to Bellugi's proposed stages, however they nonetheless found significant numbers of uninverted subjects and verbs in early child English yes-no and wh- questions. Erreich (1984) studied eighteen children in their homes using both spontaneous speech and elicited production. Her findings showed optional inversion for both wh- questions as well as yes-no questions, but especially of interest was her description of which wh-pronouns were the most difficult for children to invert, which we will discuss below.

In all of the aforementioned studies, there were errors due to test type. The present study implements a grammaticality judgment task to avoid some of the errors that can result from parent-reported data (Ingram & Tyack) or from elicited production (Erreich). Erreich (1984) noted that children were more likely to produce inverted questions in spontaneous speech than elicited speech, which suggests that children use constructions with which they feel comfortable. Receptive tasks, such as ours, reduce children's abilities to take advantage of possibly lexically stored utterances because it provides the child with already constructed sentences to evaluate.

Erreich (1984) showed that uninverted questions differed dramatically as a function of which wh- word was used. This is interesting from the perspective of syntactic theory because wh- questions are categorized as either being "argument" or “adjunct” questions. Argument questions are those in which the wh- element is a subcategorized argument of the verb and in this way connected directly the verb's meaning, e.g. the direct object of a transitive verb, as in example 4. Adjunct questions are those in which the wh-element is not connected to the verb's meaning and could be attached to virtually any verb, whether transitive or intransitive, as in example 5.

4. a) Bill ate cheese.

   b) What did Bill eat?

5. a) Bill ate cheese because he was hungry.

   b) Why did Bill eat cheese?

According to Erreich, the percentages of argument and adjunct questions that were uninverted were as in Table 3.1, in comparison to the overall scores of the 3-year-olds from the present study.

Table 3.1 Inversion Frequencies Compared

	Erreich	Present Study
Arguments		
What	24%	60%
Where	28%	45%

Adjuncts		
When	92%	52%
Why	77%	55%

Consequently, our first question is whether, when measured receptively, we find differences similar to those Erreich found in production data. Our second question is whether the kind of verb used in the question matters. For this reason, we used an array of different verbs to answer this second question.

3.2 Methods

Participants

The participants in this study were twenty-two typically developing monolingual child English speakers from childcare centers in Central Ohio. Their ages ranged from 3;0 to 6;0. Their mean age was 4;6. The group consisted of eight 3-year-olds, seven 4-year-olds, six 5-year-olds, and one 6-year-old who successfully completed the task. Twenty-six children who were unable to successfully complete the task were excluded from the results.

Procedures

This study followed the same format as the verb finiteness task explained in Section 2.2, but it measured instead the children's grammaticality judgments of subject-verb inversion in wh- questions. We presented five questions for each wh- word (*what, where, when, why*). The five verb types included for each wh- word were third person

singular present tense -s, regular preterit marker -ed, copula “be”, auxiliary “be”, and modals, such as those in examples 6-9.

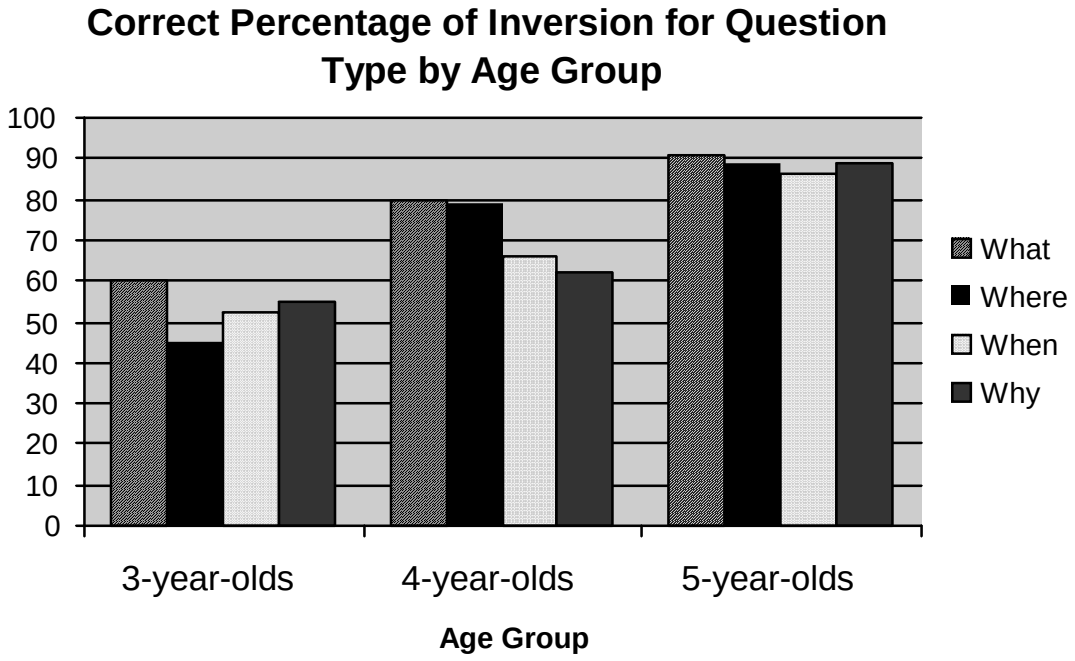
6. a) Where does the crab live?
   b) Where the crab does live?
7. a) What did the monkey eat?
   b) What the monkey did eat?
8. a) Why is Pooh looking in the pot?
   b) Why Pooh is looking in the pot?
9. a) When can the boy blow bubbles?
   b) When the boy can blow bubbles?

In addition to the twenty items, we used four filler and four practice questions, again to make sure that the children understood the test format. The filler questions included word order errors that, according to Pratt and Grinstead (2007), were easily identifiable as such by even young children, such as misplaced determiners or prepositions (e.g. The girl holds the umbrella. The girl holds umbrella the.). The filler questions were used to monitor the accuracy of children’s responses by giving us the leeway to change the order of correct/incorrect utterances on an obviously incorrect utterance based on the child’s previous response, pre-empting any preference for a particular puppet, distractedness from the task, or pattern of guessing that might have occurred.

3.3 Results

The distribution of errors in the inversion task was particularly interesting. Figure 3.1 illustrates the correct percentage levels among question types for each of the three age groups of children. It is worth noting that the error rates for 5-year-olds are fairly level as the children reach ceiling levels of performance, while the 3- and 4-year olds are quite varied.

Figure 3.1



A factor of interest also is the rate of error for each of the four wh-word questions (Figure 2.1). Erreich (1984) showed that children tended to invert *when, why* wh-questions less frequently than *what, where* wh-questions (see Table 3.1). In Erreich's results for both elicited production and spontaneous speech, it showed the uninversion percentages of

wh-questions with *what* (24%) and *where* (28%) to be dramatically less frequent than the frequency percentages of uninverted wh-questions with *when* (92%) and *why* (77%). While the participants of Erreich's study were younger than those of the present study (2;5-3;0), the only one of the current three age groups to exhibit this pattern is the 4-year-old group.

Another variable of interest is the variation of error percentage for each of the verbal elements included in the inversion task. Tables 3.2-3.4 show the percentage of errors for each question type by both morpheme and question type. While, again, there were only eight 3-year-olds who participated in this task, we see that the uninversion rates were fairly high (50% or higher in nine of the twenty categories; see Table 3.2), while the 4-year-olds only reached 50% error in three of the twenty categories (Table 3.3), and the 5-year-olds never erred as much as 50% on any single variable (Table 3.4).

Figure 3.2

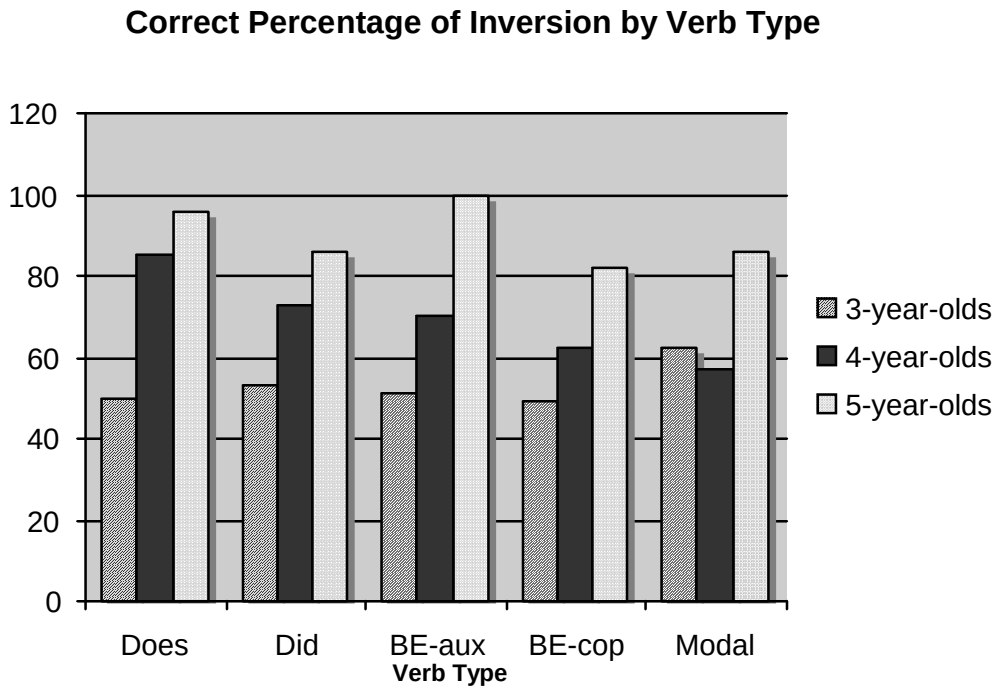


Table 3.2

Correct Percentages of Inversion by Question Type for 3-year-olds					
	What	Where	When	Why	Average
Does	88%	50%	38%	25%	50%
Did	62%	25%	62%	62%	53%
BE-aux	29%	38%	62%	75%	51%
BE-cop	57%	38%	38%	62%	49%
Modal	62%	75%	62%	50%	62%
Average	60%	45%	52%	55%	

Table 3.3

Correct Percentages of Inversion by Question Type for 4-year-olds					
	What	Where	When	Why	Average
Does	86%	100%	71%	86%	85%
Did	86%	86%	71%	50%	73%
BE-aux	86%	71%	57%	67%	70%
BE-cop	57%	71%	71%	50%	62%
Modal	71%	43%	57%	57%	57%
Average	77%	74%	65%	52%	

Table 3.4

Correct Percentages of Inversion by Question Type for 5-year-olds					
	What	Where	When	Why	Average
Does	100%	100%	86%	100%	96%
Did	86%	86%	100%	71%	86%
BE-aux	100%	100%	100%	100%	100%
BE-cop	86%	71%	71%	100%	82%
Modal	86%	86%	86%	86%	86%
Average	92%	89%	89%	91%	

3.4 Discussion

Of the children below age four, not a single one of them had reached ceiling for inversion. This is indicative that optionality for verb inversion is characteristic of all children. The average correct percentages based on verb type remained relatively consistent for all different forms.

The combination of *why* and *does* was the most strikingly difficult for 3-year-olds with only 25% correct inversion. The other variable combination that proved difficult was *what* and *auxiliary* with 29% correct inversion. Because neither *does* nor *auxiliary* appears to provide any tremendous difficulty when paired with other wh- question types, we are left to wonder what underlying syntactic or pragmatic features might be governing the non-inversion of these question types.

Chapter 4. Study 3: Comparison of Grammaticality Judgments of Verb Nonfiniteness and Uninverted Wh- Questions

4.1 Background

We have seen the restrictions that limit verb movement within a hierarchical structure, so that a verb may only move upwards in the structure (Baker 1988), and that it may not skip over an empty head without first moving through it before passing on to its final destination (Chomsky 1981). We have also seen that in child grammar verb raising is optional (Wexler 1998), which brings us to the basis for the present study, through which we explore the possibility that knowledge of verb raising might be a necessary precondition for subject-verb inversion. If so, this would be consistent with a correlation

between children's grammaticality judgments of nonfinite verbs and those of uninverted wh- questions.

4.2 Methods

Participants

The children of this study were the children of the previous studies who successfully completed both tasks. (Note: While there were the same number of children who successfully completed Study 1 and Study 2, not all children who completed one test managed to complete the other, therefore different children have been included in the results for each study.) Of these children, there were a total of eighteen children who successfully completed both. Their ages ranged from 3;0 to 6;0. Their mean age was 4;6. Of this group, there were six 3-year-olds, six 4-year-olds, five 5-year-olds, and one 6-year-old.

Procedures

The procedures consisted of the two grammaticality judgment tasks as described in Study 1 and Study 2 and then of compared results via a cross-sectional study.

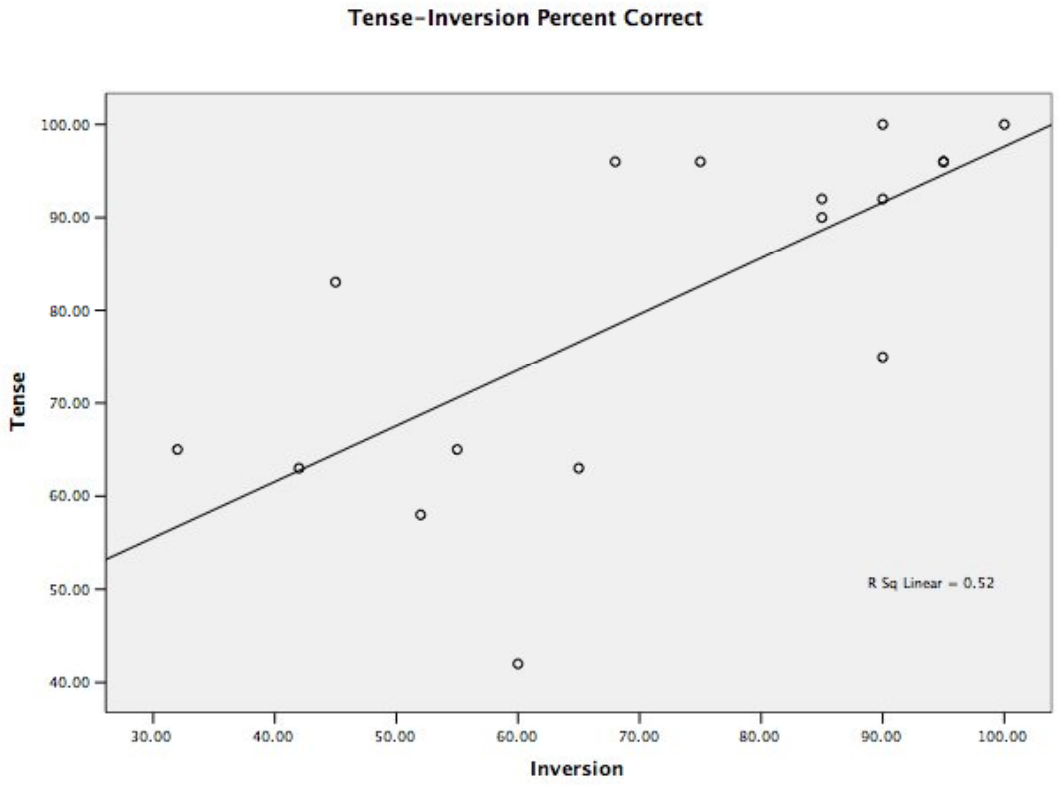
4.3 Results

Of the scorable results obtained, there are various patterns to be noted. A correlation was found between inversion and finiteness marking (Pearson Correlation = 0.646, $p < 0.01$, two tailed). That said, many of the participants appeared to be near perfect on both tasks, as illustrated by the high concentration of data points in the upper righthand quadrant of the scatterplot given in Figure 4.1 and Table 4.1.

Tale 4.1 Inversion and Finiteness Scores Compared

Inversion	Finiteness
1.00	1.00
0.95	0.92
0.95	0.96
0.95	0.96
0.90	0.75
0.90	0.92
0.90	1.00
0.85	0.90
0.85	0.92
0.75	0.96
0.65	0.42
0.65	0.63
0.63	0.96
0.55	0.78
0.52	0.58
0.45	0.83
0.42	0.63
0.32	0.65

Figure 4.1 Inversion and Finiteness Scores Compared



We plan to continue testing 3- and 4-year-old children in hopes of determining whether lower percentage scores correlate as highly as do the mostly high percentage scores given.

Of the eighteen children from whom we were able to obtain scorable data for both tasks, all but two of them demonstrated a nearly equal or greater ability to determine grammaticality based on verb finiteness rather than subject-verb inversion. This provides further evidence for our hypothesis, as subject-verb inversion in wh- questions is a secondary step after the verb has already passed through *I* to receive inflection. This also offers additional support for Chomsky's Head Movement Constraint (1981) which postulates that verbs cannot raise past an empty syntactic head without going through it because we see that the children who are unable to determine verb finiteness are even less capable of raising the verb to *C* for question formation, therefore it would be impossible for these children to invert questions with nonfinite verbs.

Based strictly on age, it seems that most children reach adult grammar levels of verb finiteness approximately by age 5 (the mean nonfinite score of children over 60 months was 92.5% correct), and subject-verb inversion by age 5;6 (the mean inversion score of children over 66 months was 92.5% correct). There was a correlation between both age and finiteness (Pearson Correlation = 0.688, $p < 0.002$, two tailed) and age and inversion (Pearson Correlation = 0.676, $p < 0.002$).

Figure 4.2

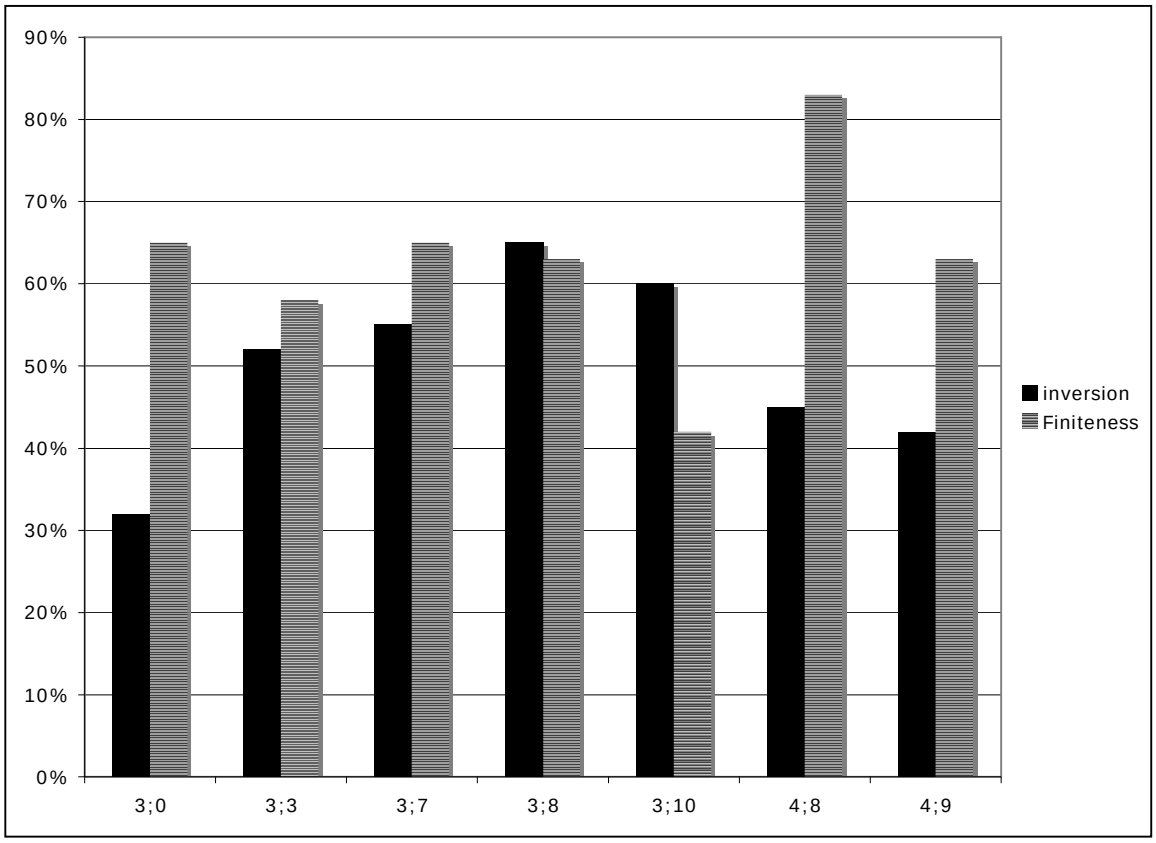


Table 4.2

Comparison of Study 1 and Study 2 Results for Children not at Ceiling			
	Age in Months	Inversion - % Correct	Nonfinites - % Correct
Child 1	36	32	65
Child 2	39	52	58
Child 3	43	55	65
Child 4	44	65	63
Child 5	46	60	42
Child 6	56	45	83
Child 7	57	42	63

4.4 Discussion

An interesting observation of this study was the number of children who determined both items presented in a single task to be grammatical and the instances in which these responses occurred. Children who gave more than three answers per test as "both" were excluded from Study 1 and/or Study 2 results. Children who gave three or fewer "both" answers per test had their "both" responses excluded from the test. Modified test scores were calculated after excluding "both" answers and were not omitted from either study.

I would like to take a moment to reflect on the "both" answers that we received on Study 1 and Study 2. Relatively few children (seven total) gave "both" as an answer to the either-or task at hand, but those who did repeatedly claimed both utterances to be grammatical. I propose that this can be interpreted as further evidence of Wexler's Optional Infinitive Stage (1998). During the Optional Infinitive Stage, both finite and nonfinite verbs are deemed to be grammatical and thus the "both" answers on these grammaticality judgment tasks provide further illustration of that.

Table 4.3

Instances of "Both" Answers in Finiteness Task	
-s	4
-ed	8
BE-aux	1
BE-cop	0

Table 4.4

Instances of "Both" Answers in Inversion Task				
	what	where	when	why
-s	0	1	3	1
-ed	0	1	0	3
BE-aux	0	1	0	4
BE-cop	1	1	0	4
Modal	0	2	0	1

Going back to Erreich's inversion study (1984), her results showed that adjunct wh- questions (*when, why*) were the most difficult to invert. Tables 4.3 and 4.4 illustrate the frequency of the "both" responses from Study 1 and Study 2. While Erreich's results do not break down the wh- questions by tense morpheme, she does describe the relative percentages of inversion with different wh- pronouns. It is evident from the data in Figure 3.1 that adjunct *why* and *when* are the most frequently uninverted, whereas argument *what* falls on the opposite end, which does follow Erreich's elicited production results.

As per verb type, past tense –ed sentences were the most frequently accepted as "both." I speculate that this is the result of past tense allomorphs consisting of both regular –ed marking and irregular suppletive forms of the "drink-drank", "eat-ate" variety. The large number and high frequency of irregular past tense forms in English likely makes learning the past tense much more difficult than present tense –s, which is completely regular. Auxiliary and copular *be,* on the other hand, only poses the relatively straightforward learning problem of memorizing four suppletive forms. In this way, it seems possible that the variability in the input caused by the irregular past tense forms is likely to make the development of a grammatical rule more difficult.

Chapter 5. Summary and Conclusions

From the above three studies we can come to several related conclusions. First, in regards to Study 1, we can see that our results support the Rice, Wexler, and Redmond's (1998) position that abstract syntactic tense develops over time and can be measured receptively, using multiple morphological expressions. The three age groups tested in this study, when represented in a cross-sectional fashion, express nearly linear growth curves for the four items of verb finiteness tested (third person singular, past tense marker, auxiliary "be", and copular "be"). Our study differs from Rice et al's in that it consisted of a single interview period, in contrast to the 1998 study, which followed children across many years. Achieving such similar results in a short-term study as in a longitudinal one, we can form the conclusion that verb markers do, in fact, develop in similar fashions.

In accordance with the pattern of nonfinite verbs we have seen in Study 1, looking at the inversion errors of wh- questions in Study 2 we see that the verb type has relatively little influence over the children's receptive ability of that verb. All verb types stayed within a 25% range from the 3-year-olds to the 5-year-olds.

The correlation within the verb types themselves is consistent with the results of Study 1, but we see that variation does exist in wh- type. This supports Erreich's (1984) study that reported a difference between adjunct wh- questions and argument wh-questions; however, our results show that adjuncts are much more readily accepted in the 3-year-old group than Erreich's elicited response and spontaneous speech task showed.

While there are several tentative conclusions that we have been able to formulate based on the present studies, we hope to continue this research to include a larger group of participants so as to expand on these findings.

6. References

Baker, Mark C. (1988). *Incorporation: A theory of grammatical function changing.* Chicago, IL: University of Chicago Press.

Bellugi, Ursula, and Edward Klima (1966). "Syntactic regularities in the speech of children." In J. Lyons & R. Wales (eds.), Psycholinguistic Papers. Edinburgh: Edinburgh University Press.

Brown, Roger (1973). A First Language: the Early Stages. Cambridge, Mass.: Harvard University Press.

Brown, Roger W., & Hanlon, Camille. (1970). Derivational complexity and order of acquisition in child speech. In R. Hayes (Ed.), *Cognition and the development of language.* New York, NY: Wiley.

Cazden, Courtney B. (1968). The acquisition of noun and verb inflections. *Child Development, 39*, 433-448.

Chomsky, Noam (1981). *Lectures on Government and Binding.* Dordrecht: Foris.

Chomsky, Noam (1995). *The minimalist program*. Cambridge, MA: MIT Press.

Erreich, Anne (1984). Learning how to ask: patterns of inversion in yes-no and wh-questions. Journal of Child Language II, 579-602.

Ingram, David, & Tyack, Dorothy L. (1979). Inversion of subject np and aux in children's questions. *Journal of Psycholinguistic Research*, 8(4),, 333-341.

McDaniel, Dana, Chiu, Bonnie, & Maxfield, Thomas. (1995). Parameters for wh-movement types: Evidence from child English. *Natural Language & Linguistic Theory, 13*(4), 709-753.

Pinker, Steven (1984). Language Learnability and Language Development. MIT Press, Cambridge, MA

Pollock, Jean-Yves (1989). Verb movement, universal grammar and the structure of IP. *Linguistic Inquiry* 20: 365-424.

Pratt, Amy, and John Grinstead (2007). "The optional infinitive stage in child Spanish". In A. Belikova, L. Meroni, & M. Umeda (Eds.), Proceedings of Generative Approaches to Language Acquisition - North America (351-362). McGill University, Montreal: Cascadilla Press.

Radford, Andrew (1990). *Syntactic theory and the acquisition of English syntax.* Cambridge, MA: Basil Blackwell.

Rice, M., and K. Wexler (1996). Toward tense as a clinical marker of Specific Language Impairment in English-speaking children. *Journal of Speech and Hearing Research 39*, 1239-1257.

Rice, M., Wexler, K., & Hershberger, S. (1998). Tense over time: the longitudinal course of tense acquisition in children with specific language impairment. Journal of Speech, Language, and Hearing Research 41, 1412-31.

Rice, M.L., Wexler, K., & Redmond, S.M. (1999). Grammaticality judgments of an extended optional infinitive grammar: Evidence from English-speaking children with specific language impairment. *Journal of Speech and Hearing Research*, 42, 943-961.

Rizzi, Luigi (1996). “Residual verb second and the Wh- Criterion.” In Adriana Belletti and Luigi Rizzi (eds.), Parameters and Functional Heads: Essays in Comparative Syntax. Oxford University Press, Oxford.

Stromswold, Karin (1992). *Learnability and the acquisition of auxiliaries*. Unpublished Doctoral Dissertation, MIT.

Travis, Lisa (1984). *Parameters and effects of word Order Variation.* PhD Dissertation MIT.

Wexler, K. (1998). "Very early parameter setting and the unique checking constraint: A new explanation of the optional infinitive stage." Lingua 106, 23-79.